REMARKS

Claim Status

Prior to this amendment, claims 52-102 were pending.[1] Without prejudice or disclaimer, Applicants cancel 57. Claim 52 is amended to incorporate the elements of canceled claim 57, such that the recited elastomeric material exhibits a specific transversal and longitudinal reinforcement relationship. In view of that amendment, Applicants further amend claim 58 by changing its dependency to claim 52. No new matter has been added since the specification and claims as filed provide Section 112 support for the claim amendments, *e.g.*, specification as filed at page 6, lines 10-19, and claims 1 and 6 as filed. Accordingly, claims 52-56 and 58-102 remain under consideration for their merits.

Rejections Under 35 U.S.C. § 103(a)

A. The Office rejects claims 52-90 under 35 U.S.C. § 103(a) as allegedly being obvious over Japanese Pub. No. 2002-347410 to Matsunaga ("Matsunaga") in view of U.S. Patent Pub. No. 2003/0032710 to Larson ("Larson"). Office Action, pp. 2-5. The Office also rejects claims 91-98 under Section 103 over Matsunaga and Larson, in further view of Japanese Patent No. 60-166506 to Kawajiri ("Kawajiri"). *Id.* at 5-6.

The Office contends that Matsunaga describes a tire that includes a "rubber layer 2B (inner tread layer) that can be viewed as the claimed 'at least one layer of crosslinked elastomeric material applied in a radially internal position with respect to the tread band.'" *Id.* at 2. In particular, the Office indicates that "inner tread layer 2B is

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[1] While the Office indicates only claims 52-101 are pending, Applicants previously added new claims 52-102 in a Preliminary Amendment filed April 25, 2006.

described as having a greater hardness than the overlying outer tread layer 2A." *Id.* The Office concedes, however, that Matsunaga "is silent as to the specific composition used to form said inner tread layer 2B and the associated mechanical properties." *Id.* In an effort to remedy this deficiency, the Office applies Larson. *Id.*

Having noted that Matsunaga desires "the inner tread layer 2B to demonstrate a high hardness," the Office contends that Larson "recognizes the inclusion of a layered inorganic material, in an analogous manner to the claimed invention, in a tire tread in order to improve stiffness/modulus of said tread." *Id.* In addition, the Office asserts that Larson "desires inner tread layer 2B to have high mechanical properties (hardness, modulus, etc.) and such is accomplished by including the disclosed inorganic material in a basic rubber composition. " *Id.* at 2-3. In turn, the Office concludes that the inner tread layer 2B "would be expected to demonstrate the claimed mechanical properties." *Id.* at 3 (emphasis in original). For at least the reasons discussed below, Applicants disagree and traverse the rejection.

Several basic factual inquires must be made in order to determine the obviousness or non-obviousness of claims of a patent application under 35 U.S.C. § 103. These factual inquiries, set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 U.S.P.Q. 459, 467 (1966), require the Examiner to:

> (1) Determine the scope and content of the prior art;
>
> (2) Ascertain the differences between the prior art and the claims in issue;
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> (3) Resolve the level of ordinary skill in the pertinent art; and
>
> (4) Evaluate evidence of secondary considerations.

The obviousness or nonobviousness of the claimed invention is then evaluated in view of the results of these inquiries. *Graham*, 383 U.S. at 17-18, 148 U.S.P.Q. at 467; *see also KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1730, 82 U.S.P.Q.2d 1385, 1388 (2007).

Indeed, to establish a *prima facie* case of obviousness, the Office must:

> make a determination whether the claimed invention "as a whole" would have been obvious at that time to that person. Knowledge of applicant's disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the "differences," conduct the search and evaluate the "subject matter as a whole" of the invention. The tendency to resort to "hindsight" based upon applicant's disclosure is often difficult to avoid due to the very nature of the examination process. However, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art.

M.P.E.P. § 2142. "The key to supporting any rejection under 35 U.S.C. § 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. " *Id.* Moreover, each prior art reference relied upon in a rejection "must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention." M.P.E.P. § 2141.03(VI) (emphasis in original); *see also Graham*, 383 U.S. at 17, 148 U.S.P.Q. at 467.

Here, consideration of the disclosures of Matsunaga and Larson as a whole reveals that one of ordinary skill in the art would not have been motivated to modify Matsunaga in an attempt to arrive at the claimed invention. First, the Office incorrectly relies upon Matsunaga's inner tread layer 2B to support its argument regarding the "at least one layer of crosslinked elastomeric material." The Office's reliance on Matsunaga is improper since it is known in the art that inner tread layer 2B would

represent part of the claimed "*tread band.*" *See e.g.*, U.S. Patent Publication Nos. 2009/0107597 at Abstract; and 2007/0006952 at ¶ [0001] (each noting that "tread band" encompasses cap/base combinations). This understanding of the term "tread band" is consistent with the numerous characterizations by Matsunaga itself, which collectively refer to layers 2A and 2B as "tread rubber 2G." *See e.g.,* Matsunaga Machine Translation, Abstract. Such a structure is inapposite to the tire structure of claim 52, which recites an elastomeric material that is "applied in a radially internal position with respect to said tread band." For at least that reason, Applicants submit that the Office's reliance on tread layer 2B in Matsunaga is misplaced because it, in combination with Larson, fails to teach each and every element of the pending claims.

Besides tread rubber 2G and layers 2A and 2B associated therewith, only rubber layer 9 would remain to be associated with the "at least one layer of crosslinked elastomeric material." The Office alleges Matsunga also teaches that rubber layer 9 would exhibit an increased stiffness when compared to the overlaying tread band 2A. *Id.* at 4. However, the Office clearly fails to consider the teachings of Matsunaga as a whole. Indeed, the Office completely disregards the fact that Matsunaga indicates the preferred shore hardness A of rubber layer 9 should be 62-64, 60-65, or 58-70, which is ***less than or equal*** to the shore hardness A values reported for layer 2B of the tread band in each of the exemplary embodiments. *See* Matsunaga Machine Translation, ¶ [0024]; Table, p. 8, row 2 (tread base rubber layer hardness).[2] Thus, contrary to the Office's assertions, a person of ordinary skill in the art considering Matsunaga in its

[2] Although the Matsunaga Machine Translation does not provide a translation for the Table at page 8, it is Applicants understanding that the values reported at row 2 represent the shore A hardness values for tread base rubber layer 2B.

entirety would not be motivated to increase the stiffness of underlying layer 9. If anything, a skilled artisan viewing Matsunaga would only be motivated to maintain or ***decrease*** the stiffness of layer 9 with respect to layer 2B. Specifically, Matsunga warns that if the layer is too hard, i.e., over 70, there is a risk the tire's stability will failure. *Id.* at ¶ [0024]. Accordingly, Matsunaga actually teaches away from adding a layered material to rubber layer 9.

Second, Applicants submit that a skilled artisan would not be motivated to combine Matsunaga with Larson in an effort to arrive at a tire exhibiting the specific properties recited in amended claim 52, e.g., dynamic elastic modulus; tensile modulus ratio (M100/M10); and M10 transversal and M10 longitudinal reinforcement ratio. Indeed, a tire exhibiting the recited properties is not taught or suggested by Matsunaga or Larson, either alone or in combination. As noted above, the Office contends that the combined references "would be expected to demonstrate the claimed mechanical properties." The Office's premise appears to be based on Applicants' examples showing the features when Dellite 67G has been used. Office Action at 3. However, there is no evidence of record that Larson's use of montmorillonite will yield the same properties as Dellite 67G, an organo-modified montmorrillonite.

In fact, Larson does not teach or suggest that its compositions may attain the claimed elastic modulus range (E') of "not lower than 20 MPa" when measured at 70°C. Rather, even at 1% strain, Larson discloses examples with a G' (the comparable variable to E') that is no higher than about 8.6 MPa (8580 kPa). Larson at page 6, Table 2. Larson also does not teach or suggest the tensile modulus ratio.

With respect to the transversal and longitudinal reinforcement relationship, the Office alleges that "the claimed quantitative relationship appears to be the direct result of forming a tire component such that the tire circumferential direction is parallel to the extrusion direction. ..." *Id.* at 3. However, even assuming that were true (and Applicants do not concede that it is), the Office's position is meritless because neither reference (alone or in combination) teaches or fairly suggests a tire composition having the specific transversal and longitudinal reinforcement relationship as claimed, i.e., wherein the % variation of the M10 (tensile modulus at 10% elongation) measured in a direction substantially parallel to the equatorial plane of the tyre, with respect to the M10 measured in a direction substantially perpendicular to the equatorial plane of the tire, is not higher than 20%. Thus, even assuming *arguendo* that a skilled artisan was motivated to combine Larson with Matsunaga, there is no factual basis to conclude that the resulting compositions would exhibit the specific properties recited in the pending claims.

Moreover, neither Larson nor Matsunaga recognize the relevant properties, e.g., E' or G', tensile modulus ratio, and M10/M10 ratio, as result-effective variables. In order for a variable to be considered result effective, and thus one that may be obvious to modify, it is not enough for a reference to recognize the existence of the variable; rather the reference must recognize that ***manipulating*** the variable "achieves a recognized result." M.P.E.P. § 2144.05(II)(B). Here, the references, at best, recognize dynamic elastic modulus as a *measured* result. For at least those reasons, a skilled artisan would not be motivated to combine Larson with Matsunaga in an effort to arrive at a tyre having the claimed properties.

B. In addition, the Office rejects claims 52-62 and 64-90 over U.S. Patent No. 5,226,987 to Matsumoto ("Matsumoto") in view of Larson, as well as claims 91-101 in further view of U.S. Patent No. 5,420,193 to Matsue ("Matsue"). *Id.* at 6-10. For at least the reasons discussed below, Applicants disagree and traverse the rejection.

With respect to the Matsumoto/Larson combination, the Office alleges that Matsumoto teaches a tire construction including a carcass 4, a belt 2, a tread band 1, a pair of sidewalls 5, and at least one layer of elastomeric material 3. *See* Office Action at 7. The Office notes that the reference "teaches that layer 3 can have a high dynamic modulus and contribute to cut resistance and furthermore, said layer can include conventional additives, such as reinforcers, to obtain the above mentioned properties (Column 2, Lines 33-51 and Column 4, Lines 1-5)." *Id.* And while the Office acknowledges that Matsumoto fails to identify specific reinforcers, it alleges that Larson recognizes "the known inclusion of an inorganic clay material (reinforce) in a tire rubber composition to obtain a high modulus/stiffness (Paragraphs 40 and 80)." *Id.*

For reasons similar to those discussed above with respect to Matsunaga and Larson, the Matsumoto/Larson combination would not result in tyre compositions exhibiting the claimed properties. Specifically, Matsumoto fails to teach or suggest the particular properties recited in the pending claims, e.g., tensile modulus ratio (M100/M10) and M10 transversal and M10 longitudinal reinforcement ratio. Moreover, because neither reference recognizes the result-effective nature of those variables, it would not be obvious for a skilled artisan to further modify Matsumoto and/or Larson in an effort to achieve the claimed properties. M.P.E.P. § 2144.05(II)(B). Thus, a skilled

artisan would not be motivated to combine Matsumoto with Larson in an effort to arrive at the pending claims.

Applicants concede that Matusmoto arguably teaches that certain embodiments of rubber reinforcing layer 3 may exhibit an E' that is not less than 20 MPa. *See* Table 2, Examples 4 and 7. However, the E' values reported in Matusumoto were reported at **30°C**, while the E' values for the inventive compositions of the instant invention were measured at **70°C**. *See* col. 5, ll. 45-49. This distinction is critical, as measuring the dynamic modulus at depressed temperatures drastically *increases* E' values. *See, e.g.*, specification at page 25, Example 2 (E' at 23°C = 53.36; E' at 70°C = 37.40). Therefore, a skilled artisan viewing Matsumoto would reasonably conclude that the highest E' values reported therein would fall well below 20 MPa when measured 70°C. Thus, a skilled artisan recognizing this distinction would not have been motivated to prepare reinforcing layer 3 compositions exhibiting E' values greater than 20 MPa when measured at 70°C, let alone exchange the reinforcing fillers described in Matsumoto for those disclosed in Larson. For at least this additional reason, the Office's proposed combination of Matsumoto and Larson fails to teach each and every element of the pending claims. Moreover, Matsue fails to remedy the deficiencies of that combination.

In view of the foregoing, the Office's rejection of the pending claims under Section 103 is improper and should be withdrawn.

CONCLUSION

In view of the foregoing amendments and remarks, Applicants submit that this claimed invention is not rendered obvious in view of the prior art references cited against this application. Applicants, therefore, request the entry of this Response, the

Office's reconsideration of the application, and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

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By: 

Jeremy S. Forest
Reg. No. 62,827
(650) 849-6655